Liquid-Vapor Equilibrium of Methane in Hexane+ Decane at Three Different Temperatures up to 20 MPa

V. Uribe-Vargas[C,S] and A. Trejo[*]

Instituto Mexicano del Petróleo,
Programa de Ingeniería Molecular,
Area de Investigación en Termofísica
[*]*Basic Sciences*
Eje Lázaro Cárdenas 152, 07730, México, D.F.
vuribe@imp.mx and atrejo@imp.mx

The recent implementation of nitrogen injection as part of the enhanced oil recovery strategies in different parts of the world promotes the increase of nitrogen content in natural gas that becomes a problem in the further processing of natural gas. In order to find adequate solutions to this problem, it is of great interest to carry out studies on the phase behaviour of selected systems since the obtained results should be the basis for the development of separation technologies that will allow the efficient separation of nitrogen from natural gas streams.

This research work has been developed in three different stages: the first one carried out a thorough literature search and review on the liquid/vapor equilibria of systems where the components included methane, nitrogen and any type of hydrocarbon; the second one included the calculation of the liquid/vapor equilibria of systems containing methane, nitrogen and several oil fractions with a cubic equation of state; the third stage of this work considered the experimental study of the liquid/vapor equilibria of methane and nitrogen in an equimolar mixture of n-hexane + n-decane at three different temperatures 258, 273 and 298 K in the range 0.1 to 20 MPa.

Thus, in this work we present experimental results for the liquid/vapor equilibria of two ternary systems: methane/hexane+decane and nitrogen/hexane+decane at 258, 273 and 298 K in the range 0.1 to 20 MPa. We have used the ASPEN Process Simulator to correlate the experimental results with the cubic equation of state of Peng and Robinson.